Report for 2004DE49B: Undergraduate Internship: Fish communities as indicators of water quality: quantifying the response of aquatic systems to pollutant inputs in Delaware headwaters

- Water Resources Research Institute Reports:
    - Fox, Dewayne A., Maria Labreveux, Trevor Knight, 2005, Fish Communities and Indicators of Water Quality: Quantifying the Response of Aquatic Systems to Pollutant Inputs in Delaware Headwaters, Delaware Water Resources Center, University of Delaware, Newark, Delaware, 25 Pages.
- Other Publications:
    - Boyd, Amy, ed., Spring 2004, Delaware Water Resources Center WATER NEWS Vol. 4 Issue 2 "Two from Delaware State University Win DWRC 2004 2005 Internships", http://ag.udel.edu/dwrc/newsletters/Spring2004.pdf, p. 3 and 5.
    - Knight, Trevor. Poster Presentation October 13, 2004. Fish Communities and Indicators of Water Quality: Quantifying the Response of Aquatic Systems to Pollutant Inputs in Delaware Headwaters. Fourth Delaware Water Policy Forum, University of Delaware, Newark, Delaware.

Report Follows

Undergraduate Internship Project #8 of 9 for FY04

Trevor Knight is studying "Fish Communities and Indicators of Water Quality: Quantifying the Response of Aquatic Systems to Pollutant Inputs in Delaware Headwaters" in his DWRC internship, teamed with advisors Dr. Dewayne Fox and Dr. Maria Labreveux of Delaware State University (DSU) Department of Agriculture and Natural Resources. Trevor hopes to measure fish health for water quality assessments in all three Delaware counties.

"This project has given me a better understanding of fish communities in small streams and has allowed me to work with water pollution response in fishes I have never seen before." – Trevor Knight

Abstract

Monitoring of surface water degradation and further remediation to comply with the 1972 Clean Water Act can be both a challenging and expensive task for regional and local governments. Through the use of an Index of Biotic Integrity (IBI) resource managers can frequently monitor water quality in a cost effective manner. Presently, the State of Delaware lacks a standardized IBI that resource managers can utilize. To this end, we explored the suitability of an IBI developed for the Coastal Region of Maryland for use in documenting faunal response to human induced changes in water quality. Three Delaware watersheds (Blackbird Creek: forested, St. Jones River: urbanized, and Broad Creek: agricultural) were selected based on published land use patterns. Within watersheds, fish sampling was conducted three times at randomly selected sites. During each sampling event, three seine passes were made in an attempt to collect all fishes. Fish sampled were identified to species, measured for total length, fin clipped, and released. Prior to fish collection, physical parameters and a water sample were collected for quantification of water quality parameters. A total of 932 fishes were collected during sampling which represented 10 families and 24 species along with one hybrid. Watershed IBI scores classified Blackbird Creek as Poor, St. Jones River as Poor, and Broad Creek as Very Poor. As a result of Delaware's rapid development in recent years, it is crucial that resource managers adopt a biological monitoring program to compliment chemical and physical monitoring. There is promise that the use of an IBI will provide a simple and inexpensive means of monitoring water quality in Delaware streams based on current analysis.